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# Corrigendum

# A graph-based regularity test for deterministic context-free languages

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The assumption that the DCFL $L$ has an LR(1) grammar in reverse Greibach Normal Form yields a subclass of the DCFL's (the quasi realtime DCFL's, as the number of $\varepsilon$ moves is bounded). However, the bound of Theorem 3.6 is seen to hold even without this assumption as is seen from the following lemma which assumes nothing about the form of the LR(1) grammar from which the DPDA is derived.

**Lemma.** *The ETS derived from an LR(1) DPDA has an MMCP* $(\xi, \bar{\xi})$ *with* $T(\bar{\xi}) \neq \varepsilon$ *iff it has an elementary cycle* $\rho$ *with* $\mu(C(\rho)) \in \bar{\Gamma}^+$ *and* $T(\rho) \neq \varepsilon$.

**Proof.** (*only if*) Assume that the ETS has an MMCP $(\xi, \bar{\xi})$ with $T(\bar{\xi}) \neq \varepsilon$. If $\bar{\xi}$ is an elementary cycle, the result follows. If $\bar{\xi}$ is not an elementary cycle, it can not have subcycles with no net accumulation as this would violate the property of minimality of the MMCP. The construction of the ETS ensures that all elementary subcycles $\bar{\rho}$ of $\bar{\xi}$ have a permutation $\rho$ with $\mu(C(\rho))\in\bar{\Gamma}^+$. Therefore there must exist an elementary cycle with the required property.

(*if*) Assume that there exists an elementary cycle $\bar{\xi}$ with $\mu(C(\bar{\xi}))\in\bar{\Gamma}^+$ and $T(\bar{\xi})\neq\varepsilon$. From the construction of the ETS we conclude that there is a cycle $\xi$ with $(\xi, \bar{\xi})$ an MMCP. $\square$

Theorem 3.6 of the paper holds with the first line modified to: The test for regularity reduces to checking that all elementary cycles of the ETS whose net effect is to reduce the size of the stack consume no input.

**Comment.** The lemma below shows that there is, in fact, a polynomial-time algorithm for deciding regularity if $L$ has a grammar in reverse Greibach Normal Form, as the test reduces to checking if the associated LR(1) DFA has a cycle.

**Lemma.** *The ETS has a cycle $\xi$ whose net effect is to increase the size of the stack iff the LR(1) DFA has a directed cycle.*

**Proof.** Follows directly from the construction of the ETS. $\square$